

CLAIMS

1. A puncture instrument which houses a plurality of puncture needles for puncturing the surface of a biologic body and can perform puncture operations continuously, said puncture instrument including

a puncture needle cartridge for holding the plural puncture needles in a state where the puncture needles are connected in series in an axis direction of the puncture instrument.

2. A puncture instrument as defined in Claim 1 wherein

said puncture needle cartridge holds each of the respective puncture needles in such a manner that a front end of the puncture needle is protected by a portion of another puncture needle which is positioned at a rear end of the puncture needle.

3. A puncture instrument as defined in Claim 1 wherein

said puncture needle comprises a needle part, and an elastic deformation member, and

said puncture needle cartridge holds each puncture needle in a state where a front end of the puncture needle is protected by an elastic deformation member of another puncture needle which is positioned at a rear end of the puncture needle.

4. A puncture instrument as defined in Claim 1 wherein

said puncture needle cartridge is disposed in a cylindrical case, and comprises

a puncture needle cartridge stopping member for stopping the puncture needle cartridge in a predetermined position in an axis direction of the case,

a biasing member for biasing the puncture needle cartridge in one direction in the case, and

a puncture button for dissolving the state where the puncture needle cartridge is biased by the biasing member in the one direction, to start a puncture operation.

5. A puncture instrument as defined Claim 1 further including a remaining quantity check means for checking the remaining quantity of the plural puncture needles in the puncture needle cartridge.

6. A puncture instrument as defined in Claim 5 wherein said remaining quantity check means has, on a side surface of the puncture instrument, a puncture needle remaining quantity check window through which the puncture needles existing in the puncture needle cartridge can be visually checked.

7. A puncture instrument as defined in Claim 1 wherein said puncture needle cartridge is detachably provided in the puncture instrument.

8. A puncture needle cartridge which contains a plurality of puncture needles for puncturing the surface of a biologic body, and is housed in a puncture instrument that is able to perform puncture operations continuously, wherein

said puncture needle cartridge holds the plural puncture needles in a state where the puncture needles are connected in series in an axis direction of the puncture instrument.

9. A puncture needle cartridge as defined in Claim 8 wherein

a front end of each of the plural puncture needles is fitted to a portion of another puncture needle which is positioned at a rear end of the puncture needle.

10. A puncture needle cartridge as defined in Claim 8 wherein

each of said plural puncture needles comprises a needle part, and an elastic deformation member, and

a front end of each puncture needle is fitted to an elastic deformation member of another puncture needle which is positioned at a rear end of the puncture needle.

11. A puncture needle cartridge as defined in Claim 8 further including

puncture needle stopping members for holding the respective puncture needles at predetermined positions in the puncture

needle cartridge.

12. A puncture needle cartridge as defined in Claim 11 wherein said puncture needle stopping members are provided in the puncture needle cartridge at a regular interval that is approximately equal to the length of the puncture needle.

13. A puncture needle cartridge as defined in Claim 8 wherein the fitting strength between the respective puncture needles is larger than a load which is applied to the puncture needle when the holding of the puncture needle by the puncture needle stopping member holding the puncture needle at the predetermined position in the puncture needle cartridge is dissolved.

14. A puncture needle cartridge as defined in Claim 8 further including

a puncture needle retaining elastic member for holding a puncture needle positioned at the head of the puncture needle cartridge to prevent escape and dropout of the puncture needle from the puncture instrument body.

15. A puncture needle cartridge as defined in Claim 14 wherein said puncture needle retaining elastic member is integrated with the puncture cartridge.

16. A puncture needle cartridge as defined in Claim 8 wherein each of said puncture needles has, at its surface, two dents which are respectively engaged with a puncture needle stopping member for holding the puncture needle in the puncture needle cartridge and engaged with a puncture needle stopping elastic member for preventing escape and dropout of the puncture needle from the puncture needle cartridge.

17. A puncture needle cartridge as defined in Claim 8 wherein a puncture needle group comprising said plural puncture needles being connected in series is provided with a puncture needle cap which protects a needle part of a puncture needle that is positioned at the head of the group.

18. A puncture needle cartridge as defined in Claim 8 further including
a rotation stopping member which engages with the body of the puncture instrument to prevent the puncture instrument from rotating around the axis of the puncture instrument.

19. A puncture needle cartridge as defined in Claim 8 further including
a remaining quantity check means for checking the remaining quantity of the plural puncture needles in the puncture needle cartridge.

20. A puncture needle cartridge as defined in Claim 19 wherein said remaining quantity check means varies the respective colors of the plural puncture needles.

21. A puncture needle cartridge as defined in Claim 19 wherein said remaining quantity check means assigns numbers (production codes) to the respective puncture needles.

22. A puncture needle cartridge as defined in Claim 8 of the present invention wherein
when a new puncture needle is loaded in the puncture needle cartridge, a puncture needle group comprising said plural puncture needles being connected in series is loaded in the puncture needle cartridge.

23. A puncture needle cartridge as defined in Claim 22 wherein
when said puncture needle group is loaded in the puncture needle cartridge, the puncture needle group is loaded only in one direction of the puncture needle cartridge.

24. A puncture needle cartridge as defined in Claim 22 further including

an improper loading prevention return member for preventing the puncture needle group from being loaded in a wrong direction

when it is loaded in the puncture needle cartridge.

25. A puncture needle cartridge as defined in Claim 8 being detachable and attachable from/to the puncture instrument.

26. A puncture instrument set comprising

a puncture instrument which is provided with a puncture needle cartridge that holds a plurality of puncture needles for puncturing the surface of a biologic body, said puncture needles being connected in series in an axis direction of the cartridge, and said puncture instrument performing puncture operation continuously; and

a puncture needle replacement jig which performs, after puncturing by the puncture needle, setting of the puncture needle cartridge at a puncture operation start position for a next puncture operation, and removal of the used puncture needle from the puncture needle cartridge.

27. A puncture instrument set as defined in Claim 26 wherein

said puncture needle replacement jig includes a replacement jig return member which holds the puncture needle after puncturing, and removes the puncture needle from the puncture needle cartridge.

28. A puncture instrument set as defined in Claim 26 wherein

said puncture needle replacement jig sets the puncture needle cartridge at the puncture operation start position simultaneously with removal of the puncture needle after puncturing.

29. A puncture instrument set as defined in Claim 26 wherein

when the puncture needle after puncturing is removed from the puncture needle cartridge by the puncture needle replacement jig, each of the plural puncture needles connected in series in the puncture needle cartridge is moved toward a front end of the puncture needle cartridge until it is held by a puncture needle stopping member which holds each puncture needle at a predetermined position in the puncture needle cartridge.

30. A puncture instrument set as defined in Claim 26 further including

a puncture needle retaining elastic member for holding a puncture needle positioned at the head of the puncture needle cartridge to prevent escape and dropout of the puncture needle from the puncture instrument body; and

said puncture needle retaining elastic member bending within an elasticity range of the puncture needle retaining elastic member due to fitting of the elastic member to a front end portion of the puncture needle replacement jig, whereby holding of the puncture needle positioned at the head of the puncture needle cartridge is dissolved.

31. A puncture instrument set as defined in Claim 26 wherein said puncture instrument is provided with a remaining quantity check means for checking the remaining quantity of the plural puncture needles in the puncture needle cartridge.

32. A puncture instrument set comprising:

a puncture instrument which is provided with a puncture needle cartridge that holds a plurality of puncture needles for puncturing the surface of a biologic body, said puncture needles being connected in series in an axis direction of the cartridge, and said puncture instrument performing puncture operation continuously; and

a puncture needle disposal instrument which performs, after puncturing by the puncture needle, setting of the puncture needle cartridge at a puncture operation start position for a next puncture operation, removal of the used puncture needle from the puncture needle cartridge, and storage of the removed puncture needle to be discarded.

33. A puncture instrument set as defined in Claim 32 wherein said puncture needle disposal instrument comprises

a disposal instrument return member for holding the used puncture needle, and removing the used puncture needle from the puncture instrument, and

a cylindrical member which can store a plurality of the removed puncture needles to be discarded.

34. A puncture instrument set as defined in Claim 32 wherein said puncture needle disposal instrument comprises

a disposal instrument return member for holding the used puncture needle, and removing the used puncture needle from the puncture instrument,

a cylindrical member which can store a plurality of the removed puncture needles to be discarded, and

a disposal box having an opening into which the cylindrical member is inserted, said disposal box being able to store the plural puncture needles to be discarded.

35. A puncture needle disposal instrument for removing, from a puncture instrument having a holding member which detachably holds a puncture needle for puncturing the surface of a biologic body, the puncture needle and discarding the same, comprising

a disposal instrument return member for holding the used puncture needle, and removing the puncture needle from the puncture instrument, and

a cylindrical member which stores a plurality of the removed puncture needles to be discarded.

36. A puncture needle disposal instrument as defined in Claim 35

wherein

a front end of the cylindrical member is closed to prevent the disposal puncture needles stored in the cylindrical member from getting out of the cylindrical member.

37. A puncture needle disposal instrument for removing, from a puncture instrument having a holding member which detachably holds a puncture needle for puncturing the surface of a biologic body, the puncture needle and discarding the same, comprising

a disposal instrument return member for holding the used puncture needle, and removing the puncture needle from the puncture instrument,

a cylindrical member which stores a plurality of the removed puncture needles to be discarded, and

a disposal box having an opening into which the cylindrical member is inserted, said disposal box being able to store the plural puncture needles to be discarded.

38. A puncture needle disposal instrument as defined in Claim 37 wherein

said cylindrical member and said disposal box are separable from each other.

39. A puncture needle disposal instrument as defined in Claim 38 further including

a means for closing the opening of the disposal box when the cylindrical member and the disposal box are separated from each other.

40. A puncture needle disposal instrument as defined in Claim 35 wherein

the whole or a portion of the cylindrical member is transparent.

41. A puncture needle disposal instrument as defined in Claim 35 wherein

the whole or portions of the cylindrical member and the disposal box is transparent.

42. A puncture needle disposal instrument as defined in Claim 37 further including

a member for guiding the outer shape of the front end portion of the puncture instrument, at the upper surface of the opening of the disposal box.

43. A puncture needle disposal instrument as defined in Claim 37 further including

a stopper for restricting the depth of insertion of the cylindrical member into the opening of the disposal box, said stopper being disposed in the vicinity of the opening of the

disposal box.